

# CHAPTER - I

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## INTRODUCTION

## **1.1 Introduction**

In India, agriculture is the largest sector of economic activity. Agriculture is the first culture that man has learnt to practice as a means of livelihood and as a way of life. It is the most important sector in South Asia. India lives in her villages is true even today, as it is the mainstay of teeming millions in rural areas of the country. Agriculture provides not only food and raw materials but also employment to a very large proportion of the population.

Agriculture has a dominant role in the Indian economy contributing nearly half of the national income and is providing employment to about 72 percent of the working population. Being the dominant sector, the improvement (or) changes in the national output depends on the output in agriculture.

Industrial sector also depends on agricultural sector for various inputs. Agriculture has become instrumental for international politics, at least in the hands of the developed nations.

Indian agriculture in general has shown a spectacular growth in terms of both production and productivity during the last five decades of planned economic development. However, it is well recognised that there are large variations in terms of growth of agricultural production and productivity across the regions, states and also amongst the crops. The increase in production and productivity of agricultural sector is imminent to maintain a balance in economic, social and political spheres of the country.

In a country like India, there are large variations in rainfall and other associated factors in different parts of the country. The availability of water and rainfall also restricts the farmers about the choice of crops that could be grown according to their water requirements.

Productivity in agriculture mainly depends on two sets of factors- technological and institutional. The technical factors includes agricultural inputs and methods such as improved seeds, fertilizers, improved ploughs, tractors, harvesters, irrigation etc., which help in augmenting the productivity. The institutional factors include redistribution of land ownership in favour of the cultivating classes so as to give them a sense of participation in agricultural production, improving the size of farms, providing security of tenure, regulation of rents etc.

Among the various inputs to agriculture, labour plays a crucial part with both male and female labour being employed. Male labour participation is quite high in some of the crop operations like irrigation, ploughing etc. while female labour participation is high in crop operations like transplanting, weeding etc.

The term agricultural labour is used to denote all persons who are hired for carrying on different agricultural operations either on permanent or temporary basis. The agricultural labourers may own some land which they cultivate on their own account (or) they may not own any land. Agricultural labourers are, therefore, forced to work as labourers on someone else's land, even as they cultivate their own land.

The census of India defines "Agricultural labour as a person who works on other person's land only as labour without exercising any supervision (or) direction in cultivation for wages in cash, kind (or) share such as a share of produce".

According to the first Agricultural Labour Enquiry Report ( 1950-51) the agricultural labourers are those “who are engaged in raising crops on payment of wages” whereas in the Second Agricultural Labour Enquiry Report (1956-57) “the category of agricultural workers also includes those who are engaged in allied occupations like animal husbandry, dairy, poultry etc”. The National Commission on Labour regards agricultural labour as one who is basically unskilled, un-organised and has nothing but physical labour to exist.

Thus, the term agricultural labour is used to denote all individuals engaged to carry out different agricultural operations, either on permanent (or) temporary basis. Agricultural labourers are fully responsible for the agricultural activities enlisted before along with the other household activities. They are also responsible for taking care of livestock, if they exist. Thus, both male and female labourers have their activities very clearly demarcated with female labour making up a major proportion.

The demarcation of labour (i.e. into male and female activities) is based on the effort required for the work. If the effort required is more (ploughing, irrigation etc.) males are employed. On the contrary if the effort required is less (transplanting, weeding etc.) females are employed.

Women play a significant and crucial role not only in agriculture and allied activities like dairy, horticulture, poultry etc., but also in household activities. Participation of women in agriculture varies from region to region, crop to crop, operation to operation depending on agro-climatic and socio cultural variations.

The nature and extent of participation of farm women in agriculture and allied activities will be affected by a host of factors, particularly diversity

of crops, cropping patterns, socio-economic status, family traditions, social customs, cultural norms and displacement due to introduction of labour. Unfortunately, women farmers have been neglected in extension efforts. It has been found that no less than 70% of operations in farming are carried out by women. Women participation in agriculture, particularly in paddy cultivation, a labour intensive crop, is more when compared to men.

Labour productivity is affected by the living and working conditions of the labourers, specially their health condition. Even now, the residential areas of the labourers who are mainly from scheduled caste and tribes are away from the village in which they are living.

Production and productivity is not the same thing. Production is the amount of the absolute flow of products during given period. Productivity is the measure of the efficiency in production of factors. The term productivity is used with reference to efficiency in production of land, labour and capital separately or together.

In general terms, productivity can be defined in terms of yield per unit of any input. However due to theoretical and measurement difficulties and data constraints, yield per unit area under cultivation is defined as the productivity.

The two variables i.e., production and productivity are the basic variables reflecting the degree of growth of the output. The term productivity is an index of progress and development. It is more important than production since it is an index of welfare.

Productivity is a ratio of output to input :

$$\text{Productivity} = \frac{\text{Net Output}}{\text{Effort Input}}$$

Thus productivity varies from men to women, from agriculture to allied activities.

Indian economy being agro-based, it highly depends on the various inputs and their productivity. Any variation in the final productivity or produce cannot just cause problems in the domestic scene but also in the international scenario. Thus, it is important to understand the underlying assumption, determinants and other factors that influence productivity. This is precisely what this study aims at.

## **1.2 An overview of Andhra Pradesh**

Agriculture plays a vital role in the economic development of any region (or) country. It forms predominant source of livelihood for over 76 per cent of population, and it serves as a catalyst for generating economic growth by increasing farm productivity in Andhra Pradesh.

Agriculture is the main source of occupation and accounts for a significant part of the national income in A.P. It is the largest and most important sector of our economy. Agricultural development is essential for industrial development in many ways. It has been the source of supply of raw materials to the leading industries like Cotton, Jute and Sugarcane, Vanaspathi and Plantation. The role of industrialisation generally underestimates the importance of agriculture sector in developing economies.

In India, Andhra Pradesh occupies a prominent place in agriculture. The agricultural performance in Andhra Pradesh is much better than that of the other states, except in a few selected crops. The land, water and human resources of Andhra Pradesh are richer than many parts of the country. Only after second world war, agriculture has assumed increasing importance in the

process of economic development and there is increasing demand for food grains due to increase in population.

In Andhra Pradesh the growth and performance of oilseeds is continuously increasing. The main oilseed crops in Andhra Pradesh are groundnut, sunflower, castor, sesamam, rapeseed and coconut. For the production of total oilseeds, Andhra Pradesh occupies second place in the country.

Andhra Pradesh is blessed with unique agricultural resources of all kinds which probably no other state can claim to possess in such abundance. The rich resources are awaiting exploitation. The natural resources like land, water, plant and animals are vast. Human resource is in abundance, but it is under-utilized. The physical resources are sufficient to grow food and other commodities to meet the ever increasing demands of vast population. The land, water and human resources of Andhra Pradesh are much better than those in other parts of the country. The human resources in quantitative terms are very vast, but qualitatively not very much improved.

In Andhra Pradesh the coastal districts have good rainfall. Also, the perennial rivers Godavari and Krishna flow there. Apart from the coastal districts, the other regions of AP are Telangana and Rayalaseema. Rainfall is less in Rayalaseema. Penna and its tributaries flow through Rayalaseema, but its water are not properly tapped in Rayalaseema. K.C. Canal (Kurnool, Kadapa Canal) constructed in the British period is the only source of irrigation in Kadapa District. New irrigation projects are being proposed to benefit Kadapa district.

Andhra Pradesh economy continues to be predominantly agrarian. As per the Population Census 2001 (table 1.1), the total number of workers (main and marginal) in Andhra Pradesh was 3.49 crores, of which cultivators and Agricultural Laborers were 22.70 percent and 39.60 percent respectively. Thus about 62.17 percent of the workers in the State were directly depending on agriculture for their livelihood.

**Table 1.1 : Changes in the Composition of Workforce in Agriculture in Andhra Pradesh (Percentages to total workers)**

Year	Cultivators	Agricultural Labourers	Total Agricultural workers
1981	32.74	36.79	69.53
1991	27.74	40.87	68.61
2001	22.70	39.60	62.30

*Source : Directorate of census operations, Andhra Pradesh.*

The proportion of area under Agriculture in the State is 48.7 percent which is much more than such proportion at the national level (40.4 percent), whereas the proportion of gross irrigated area in the State is 44.9 percent, as against 41.2 percent at the national level. It is India's fifth largest state with a population of 76 million. Predominantly rural, and one of the country's poorer states, AP's per capita income was about US\$503 in 2003-04 which is nearer to the national average of US\$511 in the same period.

### **1.2.1 Literacy**

All children below 7 years of age have been treated as illiterate from 1991 census onwards. The percentage of literates works out to 61.11 percent in 2001 as against 44.08 in 1991. The literacy rate of the state is lower than the all India literacy rate of 65.38 percent. Among the males, the literacy rate is 70.85 percent as against 51.17 percent among females as shown in the table 1.2.

**Table 1.2 : Literacy Status of Andhra Pradesh (Literacy Percentage)**

Year	Male	Female	Total
1961	34.98	14.01	24.62
1971	38.43	18.32	28.52
1981	44.61	23.26	34.09
1991	55.13	32.72	44.08
2001	70.85	51.17	61.11

*Source :* Hand Book of Statistics, Directorate of Economics and Statistics, Govt. of Andhra Pradesh

*Note :* Literates for the Census 1961 to 1981 related to population 5 years and above whereas for the year 1991 and onwards related to the Population 7 years and above.

### 1.2.2 Land Utilization

The total geographical area of the State is 274.40 lakh hectares. The details of Land Utilization Statistics are presented in the following table 1.3.

**Table 1.3 : Land Utilization Pattern in Andhra Pradesh, 2005-06**

S. No.	Category	Area in Hect	% of Area
1	Forests	61.99	22.6
2	barren and uncultivable land	20.84	7.6
3	Land put to non agricultural purposes	26.15	9.5
4	Cultivable waste	6.92	2.5
5	Permanent pastures and other grazing lands	6.76	2.5
6	Land under misc. trees and Groves (not included in the net area sown)	2.78	1.0
7	Other fallow lands	16.23	5.9
8	Current fallow	24.34	8.9
9	Net area sown*	108.39	39.5
10	Total geographical area	274.40	100.0

*Source :* 'An outline of Agricultural situation in Andhra Pradesh' Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Page No. 8, 2005-2006.

\*: Net Area Sown under : i) Crops is 107.45 lakh ha. ii) Fish Ponds 0.94 lakh ha.

Out of the total geographical area, 39.5 percent is under net area sown, 22.6 percent under forests, 24.34 percent under current fallow lands, 26.15 percent under land put to non-agricultural uses and 20.84 percent under barren and uncultivable land. During the year 2003-04 the net area sown increased to 102.14 lakh hectares from 97.30 lakh hectares in 2002-03. During the year 2005-2006 the net area sown including fish culture increased to 108.39 lakh hectares from 104.31 lakh hectares in 2004-2005. The gross area sown in the State 2005-2006 is 133.62 lakh hectares as against 125.18 hectares in 2004-2005 recording an increase of 6.7 percent.

### 1.2.3 Land Holdings

Agricultural production depends to a considerable extent upon the size of the units of cultivation. According to agricultural Census the average size of the land holdings in Andhra Pradesh is 1.25 hectares. The details are in table 1.4.

**Table 1.4 : Distribution of Land Holdings by Size Class in 2000-01**

Size of holdings	No. of holdings (lakh)	% Total	Area (lakh hectares)	% total	Average size of holdings
Marginal (Upto 1.0 hect)	70.23	60.91	34.04	21.50	0.44
Small (1.0-2.0 hect)	25.18	21.84	35.65	24.76	1.42
Semi-Medium (2.0-4.0 hect)	14.23	12.34	37.95	26.35	2.67
Medium (4.0 -10.00 hec)	5.01	4.34	28.55	19.83	5.70
Large (10.0 above hect)	0.66	0.54	10.80	7.50	16.36
<b>Total</b>	<b>115.31</b>	<b>100.00</b>	<b>143.99</b>	<b>100.00</b>	<b>1.25</b>

*Source: Planning Department, Economics Survey, Govt. of Andhra Pradesh Page No. 22, 2004-05.*

#### ***1.2.4 Area, Production and Productivity of Crops***

Agriculture in the State has made rapid strides taking the annual food grains production from 56.24 lakh tonnes during 1955-56 to 136.97 lakh tonnes during 2003-04. The total production of food grains in the state was estimated at 169.50 lakh tonnes in 2005-2006 as against 133.94 lakh tonnes in 2004-2005 showing an increase of 26.5 percent. Rice is the principal crop extensively cultivated in all the districts of the State both in Kharif and Rabi seasons. It accounted for 29.8 percent of the total cropped area, 69.1 percent of the total food grains productions during 2005-2006. The area under Rice during 2005-06 was 39.82 lakh hectares as against 30.86 lakh hectares 2004-05 recording an increase by 29 percent. The production of Rice during 2005-06 was 117.04 lakh tonnes as against 96.01 lakh tonnes in 2004-05 recording an increase by 21.9 percent. In the case of productivity. Rice has gone down to 2939 kgs/hect in 2005-06 from 3111 kgs/hect in 2004-05 because some parts of the area of rice mainly in Godavari districts affected by several floods/cyclones. From 1994-95 to 2005-06 total productivity of rice and other selected crops are presented in table 1.5. Next to Rice, Jowar is the principal food grain crop in the state. Jowar is largely grown in the districts of Kurnool, Mahbubnagar, Ranga Reddy, Medak and Adilabad which together accounted for 80.9 percent of area under this crop during 2005-06 in the State. The yield rate of Jowar was 1324 kgs/hect during 2005-06 recording an increase by 294 kgs/hect as compared to previous year. Bajra crop is generally sown under rain-fed conditions in the State mostly in Kharif season. Visakhapatnam, Prakasam, Kurnool, Mahabubnagar and Nalgonda districts which are important for the crop accounted the average yield rate of 1014 kgs/hect in 2005-06. Ragi crop is sown under rain fed and irrigation conditions in both the seasons. Vizianagaram, Visakhapatnam, Chittoor and Mahabubnagar

districts together accounted for 80.3 percent of the total area under the crop during 2005-06. Maize crop is mostly grown in Telangana region. Groundnut is one of the important Oilseed crops mostly cultivated under rain fed conditions and is cultivated in almost all districts.

Rice productivity ranks third at all India level. This is shown in table 1.6. It ranks first in the productivity of crops like coarse cereals, jowar, maize, bengal gram. The district-wise area, production, and productivity details are presented in table 1.7. West Godavari district is at the top with the area of 4.46 lakh hectares.

**Table 1.5 : Total Productivity of Selected Crops in Andhra Pradesh (Kgs/Hectare)**

Year	Rice	Jowar	Bajra	Maize	Ragi	Groundnut	Total oil seeds
1994-95	2609	680	791	2678	1320	767	681
1995-96	2498	731	954	2630	1167	1183	967
1996-97	2654	735	922	3299	1234	930	872
1997-98	2471	653	698	2737	916	630	546
1998-99	2812	695	937	3470	1186	1082	897
1999-00	2710	728	836	3258	1143	607	534
2000-01	2936	914	1033	2996	1210	1145	927
2001-02	2978	992	776	3401	1259	739	624
2002-03	2597	973	661	2827	1079	559	535
2003-04	3011	1145	1072	3437	1290	660	634
2004-05	3111	1030	868	3142	1267	891	756
2005-06	2939	1324	1014	4073	1209	728	698

**Source :** *Planning Department, Economic Survey, Govt. of Andhra Pradesh, Page No.173, 2005-06.*

**Table 1.6 : Area and Productivity of Crops**

Crops	Productivity Kgs/ha	Rank (in India)	Production Lakhs Tonnes	Rank (in India)
Rice	2978	3	113.9	3
Bajra	761	7	1.30	9
Total Pulses	595	4	11.4	5
Groundnut	739	4	4.9	5
Cotton (Bales) (170 Kgs of lint)	289	2	18.7	2

*Source : Planning Department, Economic Survey, Govt. of Andhra Pradesh, Page No.25, 2004-05*

**Table 1.7 : District-wise Area, Production and Yield of Rice (2005-06)**

S. No.	District	Area (Area in '000' Hec)		Production ('000' Tonnes)		Productivity Kgs/Hect	
		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
1.	Srikakulam	154 (6.10)	4 (0.27)	271 (4.25)	10 (0.19)	1768	2385
2.	Vizianagaram	94 (3.72)	4 (0.27)	131 (2.05)	10 (0.19)	1390	2541
3.	Visakhapatnam	85 (3.37)	4 (0.27)	125 (1.96)	7 (0.13)	1474	1851
4.	East Godavari	217 (8.59)	170 (11.68)	349 (5.47)	801 (15.04)	1604	4711
5.	West Godavari	254 (10.06)	192 (13.19)	476 (7.46)	887 (16.65)	1877	4610
6.	Krishna	255 (10.10)	104 (7.14)	697 (10.93)	409 (7.68)	2735	3924
7.	Guntur	289 (11.44)	31 (2.13)	893 (14.00)	111 (2.08)	3090	3549
8.	Prakasam	54 (2.14)	95 (6.52)	144 (2.26)	341 (6.40)	2654	3588
9.	Nellore	18 (0.71)	190 (13.05)	55 (0.86)	714 (13.40)	3060	3763
10.	Chittoor	16 (0.63)	67 (4.60)	37 (0.58)	194 (3.64)	2289	2918

S. No.	District	Area (Area in '000' Hec)		Production ('000' Tonnes)		Productivity Kgs/Hect	
		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
11.	Kadapa	46 (1.82)	21 (1.44)	86 (1.35)	56 (1.05)	1884	2632
12.	Anantapur	25 (0.99)	23 (1.58)	70 (1.10)	55 (1.03)	2798	2402
13.	Kurnool	89 (3.52)	20 (1.37)	293 (4.59)	66 (1.24)	3304	3286
14.	Mahabubnagar	74 (2.93)	54 (3.71)	181 (2.84)	139 (2.61)	2463	2553
15.	Ranga Reddy	24 (0.95)	16 (1.10)	66 (1.03)	46 (0.86)	2785	2787
16.	Hyderabad	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0	0
17.	Medak	59 (2.34)	26 (1.79)	172 (2.70)	76 (1.43)	2885	2936
18.	Nizamabad	99 (3.92)	51 (3.50)	344 (5.39)	162 (3.04)	3482	3192
19.	Adilabad	69 (2.73)	10 (0.69)	178 (2.79)	23 (0.43)	2572	2386
20.	Karimnagar	147 (5.82)	119 (8.17)	502 (7.87)	411 (7.72)	3413	3439
21.	Warangal	139 (5.50)	63 (4.33)	441 (6.92)	205 (3.85)	3164	3283
22.	Khammam	159 (6.29)	41 (2.82)	410 (6.43)	121 (2.27)	2573	2970
23.	Nalgonda	160 (6.33)	151 (10.37)	456 (7.15)	483 (9.07)	2845	3209
	Andhra Pradesh	2526 (100.0)	1456 (100.0)	6377 (100.0)	5327 (100.0)	2524	3659

Source : 'An outline of Agricultural Situation in Andhra Pradesh', Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Page No.68-70, 2005-06.

### 1.2.5 Sources of Irrigation

The main sources of irrigation in Andhra Pradesh are canals, tanks, tube-wells and dug wells. The net area irrigated in the State increased to 36.34 lakh hectares in 2003-04 from 36.14 lakh hectares in 2002-03. Net area irrigated under wells accounted for a major share of 51.5 percent (18.70 lakh hectares) followed by canals 31.3 percent (11.36 lakh hectares) and tanks 13.5 percent (4.90 lakh hectares) in 2003-04. Net area irrigated by all sources during 2005-06 was 43.93 lakh hectares as against 38.81 lakh hectares in 2004-05 showing an increase of 13.2 percent. The net area irrigated by canals and tube wells constituted 35.38 percent and 30.7 percent respectively during 2005-06. Source-wise Net area irrigated is shown in the following table 1.8.

**Table 1.8 : Source-Wise Net Area Irrigated (Area in lakh Hectare)**

Source of Irrigation	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Canals	1649387 (36.43)	1562413 (36.87)	1208538 (33.44)	1136696 (31.28)	1345979 (34.68)	1572000 (35.8)
Tanks	726809 (16.05)	567519 (13.39)	425677 (11.78)	489560 (13.47)	477100 (12.29)	662000 (15.1)
Tube Wells	1066338 (23.55)	1115711 (26.33)	1152800 (31.90)	1195261 (32.89)	1254501 (32.33)	1351000 (30.7)
Other Wells	887963 (19.61)	811727 (19.15)	689485 (19.08)	674258 (18.55)	649135 (16.73)	636000 (14.5)
Other Sources	197232 (4.36)	180498 (4.26)	137164 (3.80)	138094 (3.80)	153875 (3.97)	155000 (3.9)
<b>Total</b>	<b>45,27,729</b> <b>(100.00)</b>	<b>42,37,868</b> <b>(100.00)</b>	<b>36,13,664</b> <b>(100.00)</b>	<b>36,33,869</b> <b>(100.00)</b>	<b>38,80,590</b> <b>(100.00)</b>	<b>43,93,000</b> <b>(100.00)</b>

*Source : Abstract of Andhra Pradesh (2006). Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad.*

### **1.3 Title of the Problem**

The title of the research topic is "An Econometric Analysis of Agricultural Productivity in Kadapa District of Andhra Pradesh".

The present investigation is designed as an empirical investigation of Agricultural Productivity in Kadapa District of Andhra Pradesh. This study mainly aims at examining the input-output relationship, resource-use productivities of male and female labour, efficiencies of male and female labour, the technical efficiencies achieved by the sample farmers, estimating the labour productivity, examining the various factors influencing the variations in the constituent components of labour productivity particularly on paddy, groundnut, sunflower and whole farm.

### **1.4 Objectives**

The present investigation is taken up with the following objectives :

- i. To work out the resource-use productivities of various resources on farm.
- ii. To compare the resource productivities of male and female labour on farm
- iii. To examine the substitutability of male and female labour on the farm.
- iv. To assess the technical efficiency levels achieved by the sample farmers on farm enterprise.
- v. To estimate the labour productivity across various crops.
- vi. To examine the various factors influencing variations in the constituent components of labour productivity.

## **1.5 Design of the Study**

The entire work is organized into eight major chapters. The First Chapter deals with the Introduction of the work covering objectives, chapterisation and limitations of the work. The Second Chapter concentrates on the select Review of Literature related to the problem. The Profile of Kadapa District is explained in the Third Chapter. Data collection & Methodology is the subject matter of the Fourth Chapter. The Role of Agriculture in Economic Development with particular reference to India and Andhra Pradesh state is discussed in the Fifth Chapter. The Sixth chapter explains Resource-Use Efficiency in Agriculture. Agricultural Productivity is analysed in the Seventh Chapter. The Summary and Conclusions are made in the last chapter.

## **1.6 Limitations**

This is a micro level study conducted at a district level by selecting samples representing the entire district. But every district / region should have its own socio-economic, political, cultural and institutional factors which differ from area to area or district to district or region to region within the state. The conclusions drawn in the study are purely concerned to the selected area and they can not be comparable to the neighbouring districts or even to the neighbouring regions within the state.